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### **REMARKS**

The misspelling in claim 34 has been corrected.

The submission of claim 28 of the September 24, 2003 amendment was erroneous because the words “a source for supplying power to the at least one winding” that were in claim 28 prior to the September 24, 2003 amendment were inadvertently omitted. Claim 28 as submitted herein includes the requirement for the source that was inadvertently omitted in the September 24, 2003 amendment and was in claim 28 prior to that date.

Applicant again traverses the rejection of claims 12-25 and 31-34 under 35 USC 112 ¶2, as being indefinite. The Examiner’s position that the phrase “remainder of the coil” does not comply with 35 USC 112 ¶2 is incorrect. The Examiner, on page 14 of the office action says “remainder of the coil limitation” is confusing because “the claim reads on one winding having the current constant and changing, which is confusing on how this is done and furthermore is not supported by the specification.” The Examiner has chosen to read the claims in a manner that makes the claims inoperative. The claims indicate there are plural windings. In order for the claims to be operative the “remainder of the coil” must be interpreted as meaning the portion of the coil that is not part of the winding having the constant current.

The test under 35 USC 112, ¶ 2 is whether a member of the public can determine if the product it is making or is planning to make infringes or will infringe the claim. The test is not to twist the claims so they are read in a manner which renders the claims inoperative. The Examiner, in suggesting that “remainder of coil” be changed to -- another of the windings -- is attempting to use 35 USC 112, ¶2 to force applicants to narrow their claims. This is an incorrect use of 35 USC 112, ¶2.

The attention of the Examiner is directed to §2173.02 of the Manual of Patent Examining Procedure which indicates the examiner’s focus during examination of claims for compliance with the requirement for definiteness of 35 USC 112, ¶2, is whether the claim meets the

threshold requirements of clarity and precision, not whether more suitable language or modes of expression are available. This portion of the MPEP indicates the examiner needs to permit some latitude in the matter of expression and aptness of terms even though the claim language is not as precise as the examiner might desire. Definiteness of claim language must be analyzed, not in a vacuum, but in light of the content of the particular application disclosure, the prior art teachings and the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made. In the present case, one of ordinary skill in the art would not interpret the claim as set forth on page 14 of the office action because of the prior art teachings and the content of the present application disclosure. The office action ignores these principles by making the statement set forth on page 14.

Before discussing the application of the references to the claims, applicants discuss some erroneous principles of patent law repeatedly set forth in the office action. These erroneous principles are the basis, in many cases, for the erroneous rationale used to reject the claims. The erroneous principles are: (1) a rejection is suitable merely if an apparatus is capable or can perform a particular function; (2) functional language in apparatus claims can be ignored; and (3) the fact that a certain characteristic may be present in the prior art, is sufficient to establish inherency of that characteristic.

Concerning item (1), the office action on pages 4, 5, 7 (twice) and 11 states that because a reference is capable of controlling or varying a parameter, such as total power, variable impedance arrangements and current, it is obvious to provide an apparatus for the control or variation. The office action on pages 15 and 17 states that because the rejection is for apparatus claims, the prior art only has to provide a structure that is capable of performing in the claimed manner and not necessarily ever having been intended to be used in this manner. The Examiner cites no decision in support of this unique position which is contrary to established case law.

As pointed out, for example in MPEP §2143.01, the fact that references can be combined or modified is not sufficient to establish prima facie obviousness. In *re Mills*, 916 F.2d 6.80, 16 USPQ 2<sup>nd</sup> 1430 (Federal Circuit 1990). In the *Mills* case, the claims were directed to an apparatus for producing an aerated cementitious composition by drawing air into a cementitious composition by driving a pump at a capacity greater than a feed rate. The prior art disclosed that

a feed means can be run at a variable speed. However, the Federal Circuit found that the mere fact that the prior art disclosed that a feed means can be run at a variable speed, does not require the output pump to be run at the claimed speed so that air is drawn into the mixing chamber and is entrained in the ingredients during operation. Although a prior art device “may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so.” Based on the foregoing, the position of the Examiner that “The prior art only has to provide a structure that is capable of performing in the manner claimed and not necessarily have ever been intended to be used in this manner.” is contrary to established law.

Regarding item (2), the *In re Schreiber and Hewlett-Packard Company v. Bausch & Lomb, Inc.*, decisions cited on page 17 of the office action are inapposite. The Schreiber decision, 128 F3d 1473, 44 USPQ 2d 1429 (Federal Circuit 1997), deals primarily with a rejection based on anticipation under 35 USC 102 and is concerned with inherency. In fact, the Schreiber decision approvingly cites *In re Swinehart*, 439 F2d 210, 212, 169 USPQ 226, 228 (CCPA 1971) that says there is nothing intrinsically wrong with defining something by what it does rather than what it is. The Swinehart case was directed to a structure having a certain chemical compound and included a requirement for the compound to produce a product that was opaque to infrared energy. The prior art disclosed the compound, but failed to indicate the infrared opaque feature. The infrared opaque feature was thus the distinguishing feature of the claim over the cited art. The court found the claim had been improperly rejected.

The *Hewlett-Packard v. Bausch & Lomb* case, 909 F2d 1464, 15 USPQ 2d 1525 (Federal Circuit 1990) is inapposite because the quoted sentence is clearly dicta. In this case, the court held the claim being attacked as invalid to be valid. The comment was made in response to an argument Bausch and Lomb advanced against the Hewlett-Packard claim that Hewlett-Packard had an obligation to show “operational differences” of the claimed device over the prior art. The court replied by saying the Hewlett-Packard apparatus claim covers what a device is, not what a device does. The court did not preclude the possibility of a functional limitation giving meaning to an apparatus claim. After making the statement quoted in the Office Action, the court said “An invention need not operate differently than the prior art to be patentable, but need only be different.” This statement clearly indicates that the court recognized that if an apparatus operates differently from the prior art, patentability can arise. Thus the quoted

sentence in the Office Action, in addition to being dicta, was taken out of context.

Regarding item (3), the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In *re* Rijckaert, 9 F3d 1531, 1534, 28 USPQ 1955, 1957 (Federal Circuit 1993); in *Re* Oelrich, 666 F2d 578, 58, 582, 212 USPQ 323, 326 (CCPA 1981). To establish inherency, extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference and that it would be so recognized by persons of ordinary skill in the art. Inherency may not be established by probabilities or probabilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. In *re* Roberston 169 F3d 743, 745, 49 UDSPQ 2nd 1949, 1950-1951 (Federal Circuit 1999). In relying upon a theory of inherency, the examiner must provide a basis in fact or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the prior art. *Ex parte* Levy, USPQ 2nd 1461, 1464 (Board of Patent Appeals and Interferences 1990).

Applicants discuss the law of inherency because the Examiner seems to equate the word “control” with the word “varying.” The word “control” is a broad word that can and frequently means merely turning a device on and off, rather than varying an output parameter, particularly power of the device.

Applicants traverse the rejection of claims 11 and 31 as being anticipated by Chu et al. (US 6,051,073). Chu et al. does not anticipate claim 11 because the claim requires directly varying the total power of a source. Claim 31 is not anticipated by Chu et al. because claim 31 requires an AC source for supplying power to the windings for causing different parallel currents to flow in the parallel connected windings. A controller coupled with the AC source varies the total amount of power supplied by the source to individual plural windings. Claim 31 also says that for different distributions of electromagnetic fields different amounts of total power are applied by the source to the windings.

Of course, a proper anticipation rejection requires a single reference to disclose or inherently have all claimed features. The reliance in the office action on column 5, lines 57-60 of Chu et al. to disclose the requirements of claims 11 and 31 to directly vary the total output

power of the source fails to comply with the foregoing requirement of a proper anticipation rejection. Column 5, lines 57-60 of Chu et al. states “the RF generator is controlled by a signal E from the controller 62. In one embodiment, the controller 62 controls the power to the antenna by a signal F to the matching network 50.” Because matching network 50 is not the power source, Chu et al. has no disclosure of directly varying the total output power of source 66 that drives matching network 50. Control of the RF generator 66 by signal E does not necessarily mean the output power of generator 66 is directly varied so that for different distributions of electromagnetic fields, different amounts of total power are supplied by the source to the windings. The control of generator 66 is very likely only to involve turning the source on and off.

Applicants traverse the rejection of claims 12, 32-35, 37 and 39 as being obvious as a result of the Chu et al reference. The Examiner, in rejecting claims 12 and 34, states that because the apparatus of Chu et al. is capable of controlling the total power and the variable impedance arrangements in the different windings, it would have been an obvious choice of design to one of ordinary skill in the art to arrange the Chu controllers so that the current flowing in one of the windings is substantially constant while the current in the remaining winding changes to control the distribution and uniformity of the plasma. The Examiner gives no reason for this conclusion, other than because the Chu et al. apparatus is capable of controlling total power and variable impedance arrangements. As previously pointed out, this is an improper test for establishing obviousness of apparatus claims.

In rejecting claims 32 and 33, the Examiner says the Chu et al. controller:

“is capable of varying the total power and the current in each winding. Therefore, it would have been an obvious choice of design to one of ordinary skill in the art to arrange the controller so that the current applied to the exterior winding is varied in order that the electromagnetic field generated by the exterior winding exceeds, is less than or is the same as the electromagnetic field generated by the remainder of the coil in order to control the distribution and the uniformity of the plasma, therefore controlling the process being performed within the apparatus.”

The Examiner gives no rationale for this conclusion about obviousness. The mere fact that the Chu et al. controller is capable of varying total power and current does not mean that

Chu et al. makes obvious what the Examiner says is obvious. The Examiner has failed to provide the necessary rationale to establish a *prima facie* case of obviousness.

The rejection of dependent claims 35, 37 and 39 is incorrect for the same reasons as those stated for the independent claims upon which these claims depend. In addition, the radial and circumferential extending nature of the windings recited in claims 35, 37 and 39 helps to provide greater plasma uniformity.

Applicants traverse the rejection of claims 11, 12, 31-35, 37 and 39 as being obvious as a result of Sato et al. (US 5,907,221) in view of Tomioka et al. (US 5,897,713) or Chu et al. The Examiner mischaracterizes Sato et al. by saying elements 160a-k and 165a-k are variable impedance arrangements. In fact, Sato et al. is vague and ambiguous with regard to reactive networks 165a-165k and associated variable capacitors 160a-160k, as an inspection of column 4, lines 10-18 indicates. This portion of Sato et al. says reactive networks 165a-165k may be RF impedance match networks and that control over each variable capacitor in the bank of variable capacitors 160a-160k is exercised by a source power distribution controller. Sato et al. never says networks 165a-165k include variable impedances. Hence, control of any circuit elements in networks 165a-165k is never disclosed by Sato et al. The patent also never says controller 180 controls any elements in networks 165a-165k to control the power applied to antenna loops 150a-150k. In contrast, the patent specifically says the controller for the values of capacitors 160a-160k controls the power applied to antenna loops 150a-150k. Based on the foregoing, Sato et al. does not necessarily control reactances in networks 165a-165k to control the power supplied to the antenna loops 150a-150k. In this regard, the attention of the Examiner is directed to the previous discussion about inherency.

The Examiner recognizes Sato et al. fails to disclose the claimed controller for directly varying the total output power of source 170. As previously discussed herein, the Examiner erroneously says Chu et al., in column 4, lines 18-20, discloses a controller 62 for varying the total power that source 66 supplies to plural parallel connected windings.

The Examiner relies on Tomioka et al. for the feature of directly controlling the output power of RF sources 7 and 10 that drive two separate coils, as most clearly indicated by Figure 5. However, the claims require the source output power to be varied, not controlled. Tomioka

never says RF power is varied. None of the references have a disclosure of varying power to achieve the claimed results. As far as Tomioka et al. is concerned, the power is probably controlled so it is either on or off. Hence, the references, as a whole, do not make obvious the claim 11 requirement for a controller coupled to the source and components for (a) directly varying the total output power of the source and the total power the source supplies to the plural parallel connected windings and (b) varying values of components of the variable impedance arrangements so that for different distributions of electromagnetic fields the source is arranged to supply different amounts of total power and different relative currents to the plural parallel connected windings.

The attention of the Examiner is again directed to the legal principles set forth supra in connection with item (3). There is no specific disclosure in Tomioka et al. of varying the output power of sources 7 and 10 so that for different amounts of total power, there are different distributions of electromagnetic fields, as independent claims 11 and 31 require. The Examiner has advanced no evidence or rationale that such a feature is inherent in Tomioka et al.

Based on the foregoing, one of ordinary skill in the art would not have modified Sato et al. as a result of Chu et al. or Tomioka et al. to arrive at the combinations of independent claims 11 and 31.

Each of claims 12, 23, 33 and 34 includes a limitation not disclosed in any manner by any of the references the Examiner has applied against these claims. Claim 12 says a controller is arranged for varying the source total power and first and second capacitors so that for different distributions of electromagnetic fields generated by and supplied by the different windings to the plasma the current flowing in one of the windings remains substantially constant and the current in the remainder of the coil changes. Claim 32 requires a controller to be arranged for varying currents applied by an AC source to the windings for causing the electromagnetic field generated by an exterior winding to exceed the electromagnetic field generated by the remainder of the coil. Claim 33 requires a controller for varying the currents applied by an AC source to the windings for causing the electromagnetic field generated by an exterior winding to be less than the electromagnetic field generated by the remainder of the coil. Claim 34 includes the



limitation of a controller arranged for varying the currents applied by an AC source to the windings for causing the current flowing in one of the windings to remain substantially constant and the current in the remainder of the coil to change. The Examiner says these limitations are obvious because the references are capable of controlling the total power and the variable impedance arrangements in the different windings. As discussed previously, the test for obviousness is not what something is capable of doing, but what is obvious to one of ordinary skill in the art. See item (1), discussed supra. The Examiner has made no attempt to establish a rationale as to why the foregoing limitations are obvious.

The Examiner says claims 13-16, 18-25, 28-30, 36, 18 and 40 are obvious as a result of Chu et al in view of Chen et al (WO00/00993); the inventors of Chen et al are the same as the inventors of the present application.

Each of claims 13-16, 18 and 19 depends ultimately on claim 11 and is allowable with claim 11. The Chen et al. reference does not overcome the foregoing defects in the Examiner's reasoning anent claim 11. One of ordinary skill in the art would not have combined Chen et al with Sato et al because the Chu et al. and Sato et al. coils differ so extensively. In Sato et al, many coils, each of which is associated with a particular area of the plasma chamber, are employed. In contrast, each of Chen et al coils covers large overlapping regions in the chamber. The magnetic flux derived from one of Chen et al. coils interacts in the chamber to a great extent with the magnetic flux of another coil. In contrast, the magnetic fluxes from the different coils of Sato et al are coupled to different regions and do not appear to appreciably interact. As a result, one of ordinary skill in the art would not have been interested in modifying the Sato et al magnetic fields so that the location and/or maximum amplitude of the current in the different windings are varied. Sato et al tends to achieve uniformity solely by controlling the power supplied to each of the different windings associated with a different chamber region. The Examiner again erroneously says obviousness occurs solely because Chu et al "is capable of varying the variable reactance of each impedance arrangement."

The Examiner's rationale for combining Chu et al. and Chen et al. to meet the requirements for first and second capacitors connected to opposite ends of each winding, as required by claim 18, is incorrect. The nature of the coil array of Chu et al., wherein each coil

derives a magnetic field that is applied to a separate area within the chamber, is incompatible with the Chen et al. coil arrangement, wherein plural coils supply interacting magnetic fields to large volumes of the chamber. Consequently, one of ordinary skill in the art would not have looked from Chu et al. to Chen et al. to arrive at the combinations of claim 18.

Curiously, claim 18 depends on claim 17 that has not been rejected on the combination of Chu and Chen. Instead claim 17 is rejected on the combination of Chu et al and Van Gogh (US 6,579,426.) Hence, there does not appear to be an antecedent basis for the rejection of claim 18 as a result of Chu et al and Chen et al.

The Examiner admits Chu et al fails to include an arrangement wherein one winding is an interior winding and another winding is an exterior winding surrounding the interior winding, as claims 21-23, 32, 33, 36 and 38-40 define. She relies, incorrectly, on Chen et al. for this feature, to rectify the Chu et al. deficiency. The Chu et al arrangement, wherein each winding is associated with a different small region of the chamber, would not have been combined by those of skill in the art with the Chen et al coil, wherein different windings couple interacting magnetic flux to the same large regions of the chamber.

The limitations of many of the claims rejected on the combination of Chu et al and Chen et al are not discussed in the office action until the "Response to Arguments" portion of the office action. For example, claims 19, 24, 25, 28, 29 and 30 require the source frequency and the length of the winding to be such that there are no substantial standing wave current variations along the length of the winding. In addition, claim 20 requires power of the source and values of the reactances of the impedance arrangements to be such that (1) the maximum amplitude of the standing wave current in one of the windings differs from the maximum amplitude of a standing wave current in the remainder of the coil and (2) adjacent windings of the coil have standing wave current maxima that are radially opposite from each other. Claim 21 requires the controller to be arranged to cause the values of total power the source supplies to the coil and the reactances to be such that the electromagnetic field generated by the exterior winding exceeds the electromagnetic field generated by the remainder of the coil. Claim 22 requires the controller to be arranged to cause the values of the total power the source supplies to the coil and the reactances to be such that the electromagnetic field generated by the exterior winding is less than

the electromagnetic field generated by the remainder of the coil. Claim 23 requires the controller to be arranged to cause the values of (1) total power the source supplies to the coil and (2) the reactances to be such that the electromagnetic field generated by the exterior winding to be about the same as the electromagnetic field generated by the remainder of the coil. The office action uses the same erroneous test discussed in item (1) to say these claims are obvious and gives no rationale to support the conclusion.

The Examiner says the same claims that are rejected as being obvious over Chu et al in view of Chen et al are obvious as a result of Sato et al in view of Tomioka et al or Chu et al and further in view of Chen et al. This combination is incorrect for many of the same reasons discussed in connection with the rejection based on Chu et al and Chen et al. Sato et al is quite similar to Chu et al. because both disclose many windings, each of which couples a separate magnetic field to a different small region of a chamber. In contrast, Tomioka et al and Chen et al are concerned with coils having windings that produce magnetic fields that interact with each other over a large volume of the chamber. Consequently, the issues involving the rejection based on Sato et al in view of Tomioka et al or Chu et al and further in view of Chen et al are very similar to those involved in the rejection based on Chu et al and Chen et al. The rejection based on the four references is deficient with regard to the claims defining the relationship between source frequency and winding length such that there are no substantial standing wave current variations along the length of the winding. In addition, the previous comments concerning the failure of the references to disclose a controller for achieving the three different electromagnetic field relationships of claims 21-23 and 32-34 are applicable; these relationships are also not discussed in the rejection based on the four references.

As previously mentioned, the Examiner says Chu et al and Van Gogh et al make the combination of claim 17 obvious, the Examiner also says these references make claim 18 obvious. The Examiner admits Chu et al is deficient with respect to claims 17 and 18 because Chu et al has no disclosure of each of the windings including first and second end terminals respectively connected to first and second capacitors. While it is true that Van Gogh discloses such capacitors, the capacitor connected to one terminal of the Van Gogh coil is a blocking capacitor that is variable to control RF voltage distribution along the coil, as illustrated in Figure 13. The other capacitor 310 is described as an input capacitor. Capacitor 310 is connected

between an RF input terminal and a matching network including a shunt capacitor and a series inductor. The Examiner says the two capacitors of Van Gogh enable a symmetric current distribution to be achieved along the coil. However, there is nothing in Van Gogh et al to indicate this happens. Further, there is no reason to believe Chu et al would be interested in having a symmetrical current relationship in each of the windings thereof.

Claims 17 and 18 are also rejected by combining Van Gogh et al with Sato et al and Tomioka et al. Based on the Office Action discussion of these references in connection with claims 17 and 18, the Examiner apparently meant to base this rejection on Van Gogh in combination with Sato et al, Tomioka et al and Chu et al. The Examiner incorrectly relies on Van Gogh for the same reasons discussed in the immediately preceding paragraph. This reliance is incorrect for the reasons set forth in the immediately preceding paragraph.

Insofar as the Response to Arguments say Tomioka et al teaches direct control of the power supply to the coils and that it would have been obvious to have combined Tomioka et al with Sato et al for this feature, see the previous arguments about the fact that the claims require the power to be varied; there is no disclosure in Tomioka et al of varying the power. As previously mentioned the Tomioka et al language is probably such that the power is controlled so it is turned on and off. It is well established that the Examiner must show that a reference necessarily performs as claimed. As previously stated, it is not enough that a reference might or could perform as claimed.

The comments in the first paragraph on page 15 of the office action about motivation ignore the previously discussed fact that the Tomioka et al and Chen et al coils are entirely different from the Sato et al and Chen et al coils. Further, the Examiner's statement that the prior art, as applied to apparatus claims, only has to provide a structure that is capable of performing in the manner claimed and not necessarily ever having been intended to be used in this manner, is, not in conformance with established law, as previously discussed.

The discussion in the paragraphs bridging pages 16 and 17 concerning the relationship between the frequency of the source and the length of the windings is contrary to *In re Mills*. The comment about zero frequency is nonsense. There is no such thing as zero frequency. Further, claims 19 and 24 require RF. Claims 25 and 28, by saying the source has a frequency

precludes zero frequency. The bald statement in the sentence bridging pages 16 and 17: "Additionally, it is well known in the art [sic] alter the length of a winding to achieve a desired process" is unsupported by evidence. Furthermore, the statement is irrelevant because claims 16, 19, 24, 28-30 require the frequency and coil length to be such that there are no substantial standing wave current variations along the length of each of a winding. The Examiner, in discussing this issue in the last full paragraph on page 17 of the office action, again makes the erroneous statement that the prior art only has to provide a structure that is capable of operating in the manner claimed and not necessarily ever have been intended to be used in this manner.

The Examiner has employed, at best, circular reasoning in the paragraph bridging pages 17 and 18 concerning the combination of Chu et al. and Chen et al. She has given no rationale as to why one of ordinary skill would have combined Chu et al. and Chen et al. In contrast, applicants have shown why one of ordinary skill would not have combined these disparate references.

Early issuance of a Notice of Allowance is in order.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

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